PROC. BIOL. SOC. WASH.
97(1), 1984, pp. 179–185

A NEW SPECIES OF *OREOHELIX* (GASTROPODA: PULMONATA: OREOHELICIDAE) FROM THE SEVEN DEVILS MOUNTAINS, IDAHO

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Abstract.—*Oreohelix hammeri,* a new species of pulmonate land snail, is described from the Seven Devils Mountains of western Idaho. Comparisons are made with six taxa each having some characteristics in common with *O. hammeri.* A range extension for *Oreohelix elrodi* (Pilsbry) is noted.

Species of the land snail genus *Oreohelix* may be found throughout the Rocky Mountains of the western United States, from Arizona to Montana and Idaho. One area of the Rockies that has been visited frequently by malacologists is the southwestern portion of Idaho County, Idaho. Nine species and subspecies of *Oreohelix* have been described from this area (Pilsbry 1939; Solem 1975). This particular part of Idaho County is deeply cut by the Salmon River and its tributaries, forming many large and small canyons. These canyons create many and varied habitats which may have been the stimulus for the high levels of speciation observed here.

In July 1982, William P. Hammer, a longtime friend and an ardent outdoorsman, went on a backpacking trip into the Seven Devils Mountains of southwestern Idaho County. This paper describes a new species of *Oreohelix* collected by Mr. Hammer during that trip.

Oreohelix hammeri, new species
Figs. 1A–C

Description of holotype.—Shell heliciform, strongly depressed, whorls convex above and below, sutures somewhat impressed, body whorl strongly keeled, descending slightly at aperture, ashy horn color with no banding; widely umbilicate with umbilicus contained approximately three times in diameter. Embryonic shell of approximately 2¼ whorls, the first whorl with fine spiral lines over faint radial ridges, the remainder of embryonic whorls having progressively stronger radial ridges. Postembryonic whorls with spiral lines more or less continuous to aperture, radial ridges more prominent, irregularly spaced; sculpture on dorsal surface similar to ventral surface. Aperture ovate; parietal callus thin.

Measurements of holotype: Diameter—20.2 mm; height—8.4 mm; umbilicus diameter—6.6 mm; whorls—5¼; embryonic whorls—2¼.

Genitalia of holotype (Figs. 2A, 3A–B): Atrium short. Penis of relatively constant diameter, pustulose portion more than one-half total length of penis, penial verge large, verge opening submedial. Epiphallus with many ridges angled toward verge opening. Penial rectractor muscle inserted on penis and epiphallus. Vagina expanded slightly at proximal end, proximal half pustulose. Free oviduct short, tapering slightly proximally. Beginning of spermathecal duct expanded, tapering

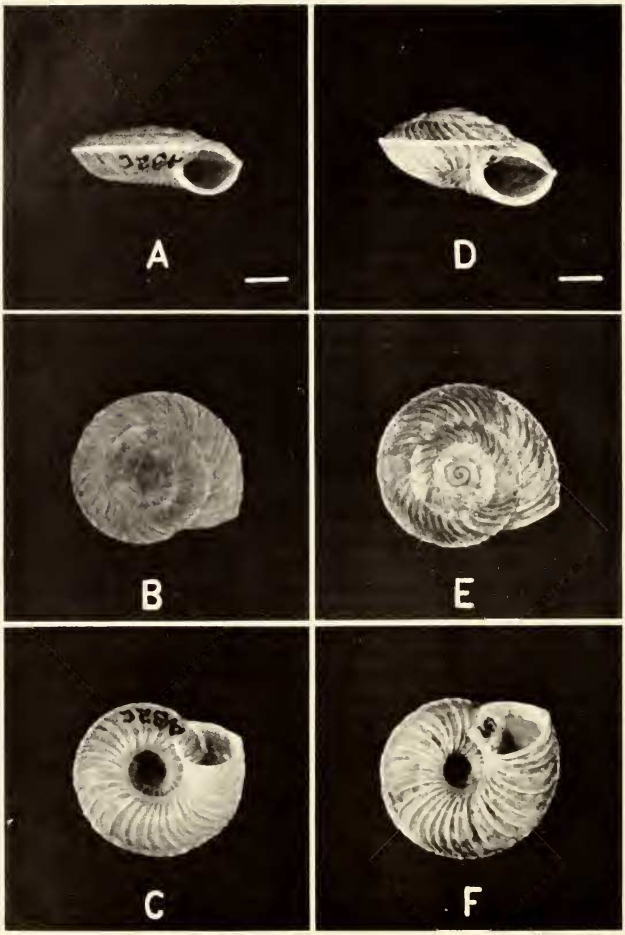

Fig. 1. Shells. Left column, *Oreohelix hammeri* (holotype): A, Side view; B, Top view; C, Bottom view. Right column, *Oreohelix elrodi* (topotype): D, Side view; E, Top view; F, Bottom view. Scale bars equal 5 mm.

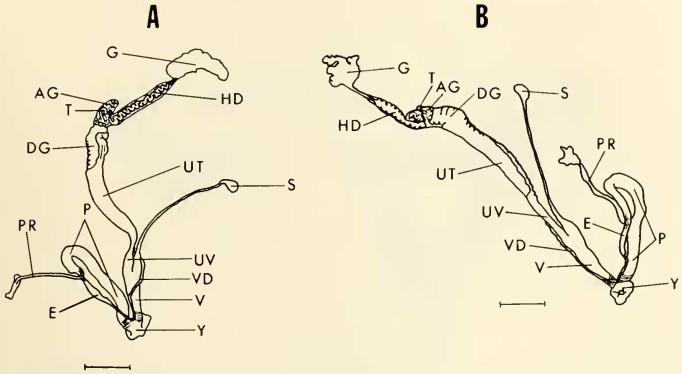

Fig. 2. Genitalia: A, *Oreohelix hammeri,* holotype. B, *Oreohelix elrodi.* Scale bars equal 5 mm, AG, albumin gland; DG, prostate gland; E, epiphallus; G, ovotestis; HD, hermaphroditic duct; P, penis; PR, penial retractor muscle; S, spermatheca; T, talon; UT, uterus; UV, free oviduct; V, vagina; VD, vas deferens; Y, atrium.

rapidly to slender duct; spermatheca ovoid. Uterus typical, without embryos. Prostate gland, albumin gland, and talon typical. Hermaphroditic duct long, tightly coiled. Ovotestis composed of 6 multilobular clumps, clumps angled slightly to columellar axis.

Measurements of holotype genitalia: Penis—15.5 mm, pustulose part—10.5 mm, ridged part—5.0 mm; epiphallus—5.0 mm; vagina—6.0 mm; free oviduct—4.0 mm; hermaphroditic duct (coiled part)—7.5 mm.

Pallial region of holotype (Fig. 4); Mantle gland well developed; vessels from mantle collar passing over mantle gland connecting with pulmonary vein. Kidney and heart typical; closed portion of ureter less than one-half length of kidney, reflexed ureteric sulcus bordered by low renal ridges. Hindgut very wide, intestinal loop along proximal edge of kidney.

Type-locality.—Loose rock of a knife-edge rock outcrop on the southeastern slope of Mt. Sampson, Seven Devils Mountains, ca. 5500 feet, Idaho County, Idaho, NE¼ sec 22 T23N R1W. No other known localities.

Disposition of type-material.—Holotype, USNM 809997, paratypes USNM 809998; H. Lee Fairbanks 432. USNM = United States National Museum of Natural History.

Diagnosis.—A species characterized by a shell that is of moderate size, with keeled periphery, has strong irregularly spaced radial ridges, and is strongly depressed.

Differential diagnosis.—*Oreohelix hammeri* is an allopatric species of the genus that is distinctive in terms of shell characteristics, genital characteristics, and ecological requirements. Six species or subspecies of *Oreohelix* appear somewhat similar to *O. hammeri*; however, each has distinct differences from this new species.

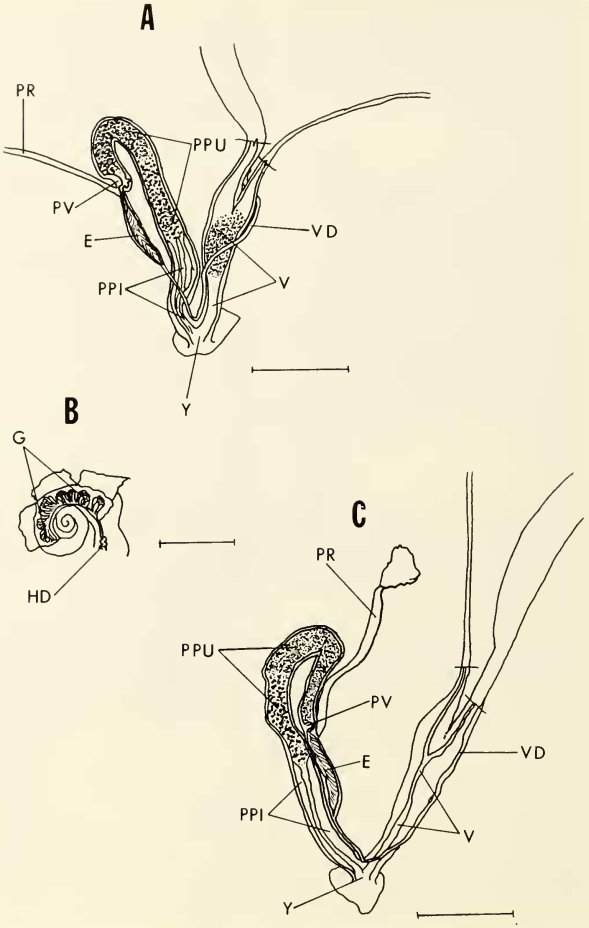

Fig. 3. A, terminal genitalia: *Oreohelix hammeri*, holotype, B, ovotestis: *Oreohelix hammeri*, paratype. C, terminal genitalia: *Oreohelix elrodi*. Scale bars equal 5 mm. E, epiphallus; G, ovitestis; HG, hermaphroditic duct; PPI, penial pilasters; PPU, penial pustules; PR, penial retractor muscle; PV, penial verge; V, vagina; VD, vas deferens; Y, atrium.

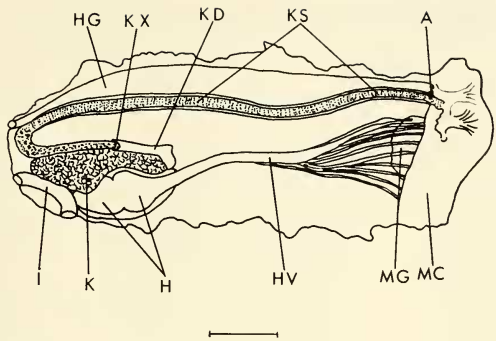

Fig. 4. Holotype, *Oreohelix hammeri,* pallial region. Scale bar equals 5 mm. A, anus; H, heart; HG, hindgut; HV, pulmonary vein; I, intestine; K. kidney; KD, closed portion of ureter; KS, ureteric sulcus; KX, opening of KD; MC, mantle collar; MG, mantle gland.

Oreohelix metcalfei radiata Pilsbry and Ferriss, found in the Black Range of Grant County, New Mexico, has a shell similar to that of *O. hammeri,* but the latter species has a shell that is more depressed, more umbilicate, and has stronger sculpturing (Pilsbry 1939:508; Fig. 1A–C). Most significant is the fact that the penis of *O. metcalfei radiata* has a ridged portion that is more than one-half the total length of the penis (Pilsbry 1939:512), whereas the penis of *O. hammeri* has a ridged portion that is less than one-half the total length of the penis (Table 2; Fig. 3A).

Oreohelix intersum (Hemphill), *O. waltoni* Solem, *O. idahoensis* (Newcomb), and *O. i. baileyi* Bartsch are found in Idaho County, Idaho. The shells of these four taxa are much smaller, less keeled, and much less depressed that the shell of *O. hammeri* (Solem 1975; Pilsbry 1939; 457–459; Fig. 1A–C). The reproductive system of *O. waltoni* has a loosely coiled hermaphroditic duct, a medial verge opening, and lacks a pustulose region in the vagina (Solem 1975). In *O. hammeri* the hermaphroditic duct is tightly coiled, the verge opening is submedial, and the vagina has a pustulose region (Figs. 2A; 3A). The reproductive systems of *Oreohelix idahoensis* and *O. i. baileyi* have loosely coiled hermaphroditic ducts and lateral verge openings (Solem 1975). Also, in these taxa the epiphallus (relative to the penis) is longer than that of *O. hammeri* (Solem 1975; Pilsbry 1939:459; Fig. 3A). In addition, the four taxa above are found in relatively mesic conditions, i.e., relatively near a river or stream (Solem 1975; Pilsbry 1939). *Oreohelix hammeri* is found in a xeric habitat.

Oreohelix elrodi (Pilsbry) is found in the Mission Mountains and Swan Mountains of Lake County, Montana. The shell of *O. elrodi* resembles that of *O. hammeri* more closely than the taxa noted above (Fig. 1). However, *O. elrodi* has a shell that is larger, is much less depressed, is less umbilicate, and has a greater number of whorls than *O. hammeri* (Table 1). The reproductive system of *Oreo-*

Table 1.—Shell comparisons of *Oreohelix hammeri* and *O. elrodi*. Numbers are means and standard deviations with the range in parentheses. Measurements, in millimeters, were obtained with vernier caliper.

	O. hammeri	*O. elrodi* (Mission Mts.)	*O. elrodi* (Swan Mts.)
Number	63	22	45
Diameter (D)	18.24 ± 1.97 (13.9–22.7)	22.46 ± 1.92 (19.5–25.8)	21.15 ± 1.93 (17.4–26.0)
Height (H)	7.07 ± 1.11 (5.0–9.6)	10.96 ± 0.86 (9.6–12.8)	10.19 ± 1.16 (8.4–13.1)
H/D ratio	.3874 ± 0.041 (.2888–.4725)	.4895 ± 0.034 (.4326–.5545)	.4829 ± 0.049 (.3995–.5970)
Whorls	4.62 ± 0.27 (4.0–5.33)	5.29 ± 0.19 (5.0–5.75)	5.17 ± 0.19 (5.0–5.75)
Umbilicus dia. (U)	5.31 ± 0.83 (3.7–6.9)	5.28 ± 0.74 (4.1–6.8)	4.96 ± 0.74 (3.3–6.8)
D/U ratio	3.47 ± 0.26 (3.06–4.03)	4.30 ± 0.42 (3.65–5.23)	4.31 ± 0.42 (3.71–5.94)

helix elrodi (Figs. 2B, 3C) has a shorter epiphallus (relative to the penis), a longer free oviduct (relative to the vagina), and a shorter hermaphroditic duct than that of *O. hammeri* (Table 2). In addition, *O. elrodi* has a smaller verge than *O. hammeri* (Fig. 3A, C). Also, *O. elrodi* is found in a relatively mesic habitat whereas *O. hammeri* is found in a xeric habitat. Finally, according to Pilsbry (1939:461) *O. elrodi* lacks ". . . side cusps or cutting points . . ." on the central and lateral teeth; the radular tooth formula is 27.1.27. In *Oreohelix hammeri* the central tooth is tricuspid, the lateral teeth are bicuspid, and the tooth formula is 24.1.24 with approximately 10 lateral teeth and 14 marginal teeth. The transition from laterals to marginals occurs between tooth numbers 9 and 14.

Etymology.—*Oreohelix hammeri* is named in recognition of William P. Hammer, Ronan, Montana, a valued friend, colleague, and student of western land snails.

Discussion

Solem (1975) reviewed the criteria that should be used to determine species in the genus *Oreohelix*, particularly when comparing allopatric populations. Those criteria include ecological parameters, shell differences, and reproductive system differences.

In the differential diagnosis, the above criteria were used in comparisons between six taxa and *Oreohelix hammeri*. Each of these taxa had some characteristics in common with *O. hammeri*, but in each case there were significant ecological, shell, and reproductive system differences.

Shell comparisons between *Oreohelix hammeri* and *O. elrodi* (Table 1) included specimens of *O. elrodi* collected above Lion Creek in the Swan Range, Lake County, Montana. This locality is approximately 20 miles east of the type-locality and is the first report of *O. elrodi* outside of the Mission Mountains. Voucher specimens have been sent to the USNM.

Table 2.—Reproductive system comparisons of *Oreohelix hammeri* and *O. elrodi*. Numbers are means and standard deviations with the range in parentheses. Measurements, in millimeters, were obtained with ocular micrometer.

	O. hammeri	*O. elrodi*
Number	4	3
Penis–total length	14.7 ± 1.55 (12.5–16.0)	18.8 ± 0.26 (18.5–19.0)
Pustulose part	9.9 ± 0.80 (8.8–10.5)	12.4 ± 0.79 (11.5–13.0)
Ridged part	4.8 ± 0.72 (3.8–5.5)	6.4 ± 0.53 (6.0–7.0)
Epiphallus	4.3 ± 0.70 (3.5–5.0)	4.7 ± 0.58 (4.0–5.0)
Retractor muscle	7.7 ± 1.55 (6.5–10.0)	8.3 ± 0.76 (7.5–9.0)
Vagina	6.3 ± 0.77 (5.5–7.3)	7.8 ± 0.29 (7.5–8.0)
Free oviduct	4.3 ± 0.39 (4.0–4.8)	5.8 ± 1.04 (5.0–7.0)
Spermathecal duct	15.2 ± 2.27 (13.5–18.5)	16.6 ± 0.40 (16.2–17.0)
Hermaphroditic duct (coiled portion)[2]	6.3 ± 1.44 (5.0–7.5)/	6.4 ± 0.21 (6.2–6.5)

[2] Only 2 specimens measured for *O. elrodi*.

Two additional sets of data should be noted. First, although the shell of the holotype of *Oreohelix hammeri* has no bands, many of the paratypes have a single dark band on the ventral surface approximately in the center of the whorl and a single dark band on the dorsal surface near the periphery of the whorl. Second, two of four dissected specimens of *O. hammeri* had embryos in the uterus (6 in one specimen, 9 in the other). The mean diameter of the embryonic shell was 4.0 mm ± 0.29 mm (3.5 mm–4.5 mm); the mean whorl number was 2.18 mm ± 0.20 mm (2.0 mm–2.5 mm).

Literature Cited

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